AMENDMENTS TO THE CLAIMS

Claim 1 (Withdrawn): A method for producing an integrated optical waveguide with a patterned upper cladding comprising the steps of:

a) depositing a core layer onto a substrate, optionally with a lower cladding layer therebetween;

b) patterning the core layer to provide a light transmissive element;

c) depositing an upper cladding layer onto the light transmissive element; and

d) patterning the upper cladding to provide at least one region in which the light transmissive element is air clad.

Claim 2 (Withdrawn): A method according to claim 1 wherein the light transmissive element is air clad on at least one end.

Claim 3 (Withdrawn): A method according to claim 2 wherein the light transmissive element comprises a waveguide and lens as a unitary body.

Claim 4 (Withdrawn): A method according to claim 3 wherein the lens has an air clad curved surface.

Claim 5 (Withdrawn): A method according to claim 1 wherein the light transmissive element is air clad on at least one side.

Claim 6 (Withdrawn): A method according to claim 5 wherein the light transmissive element comprises a waveguide with a bend.

Claim 7 (Withdrawn): A method according to claim 6 wherein the waveguide has an air clad surface in the region of the bend.

Claim 8 (Withdrawn): A method according to claim 7 wherein the waveguide has an air clad surface on the side corresponding to the outside of the bend.

Claim 9 (Withdrawn): A method according to claim 1 wherein a portion of the upper cladding matches a portion of the light transmissive element.

Claim 10 (Withdrawn): A method according to claim 1 wherein a top portion of the light transmissive element is air clad.

Claim 11 (Withdrawn): A method according to claim 1 wherein the upper cladding layer comprises a polymeric material.

Claim 12 (Withdrawn): A method according to claim 11 wherein the polymeric material comprises a thermally curable polymer.

Claim 13 (Withdrawn): A method according to claim 12 wherein the thermally curable polymer is a siloxane polymer.

Claim 14 (Withdrawn): A method according to claim 11 wherein the polymeric material comprises a polymer curable by actinic radiation.

Claim 15 (Withdrawn): A method according to claim 14 wherein the actinic radiation is ultraviolet light.

Claim 16 (Withdrawn): A method according to claim 14, wherein the polymeric material is a siloxane polymer.

Claim 17 (Withdrawn): A method according to claim 1 wherein the upper cladding layer is patterned by selective curing with a patterned heat source and uncured material dissolved with a solvent, whereby cured material is insoluble in the solvent.

Claim 18 (Withdrawn): A method according to claim 1 wherein the upper cladding layer is patterned by selective curing with a patterned source of ultraviolet light and uncured material dissolved with a solvent, whereby cured material is insoluble in the solvent.

Claim 19 (Withdrawn): A method according to claim 1 wherein the substrate comprises silicon, quartz, fused silica, glass, or a polymeric material.

Claim 20 (Withdrawn): A method according to claim 19 wherein the polymeric material comprises an acrylate, Perspex, polymethylmethacrylate, polycarbonate, polyester, polyethyleneterephthalate or PET.

Claim 21 (Withdrawn): A method according to claim 1, wherein the lower cladding layer, where present, and light transmissive element comprise materials selected from polymeric materials, glass and semiconductors.

Claim 22 (Withdrawn): A method according to claim 21, wherein the polymeric materials comprise a polymer curable by actinic radiation.

Claim 23 (Withdrawn): A method according to claim 22, wherein the actinic radiation is ultraviolet light.

Claim 24 (Withdrawn): A method according to claim 22, wherein the polymeric material is a siloxane polymer.

Claim 25 (Currently Amended): An integrated optical waveguide ~~with patterned upper cladding~~ comprising:

a substrate;

~~an optional lower cladding layer;~~

a light transmissive element comprising a waveguide and a lens as a unitary body; ~~and~~

~~a patterned~~ an upper cladding patterened to have at least one region in which the light transmissive element is ~~having at least one~~ air clad ~~region~~; and

wherein said lens has a face perpendicular to the substrate and focuses light in a plane parallel to the substrate

Claim 26 (Original): An integrated optical waveguide according to claim 25 wherein the light transmissive element is air clad on at least one end.

Claim 27 (Cancelled)

Claim 28 (Currently Amended): An integrated optical waveguide according to claim [[27]] 25, wherein the lens has an air clad curved surface.

Claim 29 (Withdrawn): An integrated optical waveguide according to claim 25 wherein the light transmissive element is air clad on at least one side.

Claim 30 (Withdrawn): An integrated optical waveguide according to claim 29, wherein the light transmissive element comprises a waveguide with a bend.

Claim 31 (Withdrawn): An integrated optical waveguide according to claim 30, wherein the waveguide has an air clad surface in the region of the bend.

Claim 32 (Withdrawn): An integrated optical waveguide according to claim 31, wherein the waveguide has an air clad surface on the side corresponding to the outside of the bend.

Claim 33 (Original): An integrated optical waveguide according to claim 25 wherein a portion of the upper cladding matches a portion of the light transmissive element.

Claim 34 (Original): An integrated optical waveguide according to claim 25 wherein a top portion of the light transmissive element is air clad.

Claim 35 (Original): An integrated optical waveguide according to claim 25, wherein the upper cladding comprises a polymeric material.

Claim 36 (Original): An integrated optical waveguide according to claim 35, wherein the polymeric material comprises a thermally curable polymer.

Claim 37 (Original): An integrated optical waveguide according to claim 36, wherein the thermally curable polymer is a siloxane polymer.

Claim 38 (Original): An integrated optical waveguide according to claim 35, wherein the polymeric material comprises a polymer curable by actinic radiation.

Claim 39 (Original): An integrated optical waveguide according to claim 38, wherein the actinic radiation is ultraviolet light.

Claim 40 (Original): An integrated optical waveguide according to claim 39, wherein the polymeric material is a siloxane polymer.

Claim 41 (Original): An integrated optical waveguide according to claim 25, wherein the upper cladding is patterned by selective curing with a patterned heat source and uncured material dissolved with a solvent, whereby cured material is insoluble in the solvent.

Claim 42 (Original): An integrated optical waveguide according to claim 25, wherein the upper cladding is patterned by selectively curing with a patterned source of ultraviolet light and uncured material dissolved with a solvent, whereby cured material is insoluble in the solvent.

Claim 43 (Original): An integrated optical waveguide according to claim 25, wherein the substrate comprises silicon, quartz, fused silica, glass, or a polymeric material.

Claim 44 (Original): An integrated optical waveguide according to claim 43, wherein the polymeric material comprises an acrylate, Perspex, polymethylmethacrylate, polycarbonate, polyester, polyethyleneterephthalate or PET.

Claim 45 (Currently Amended): An integrated optical waveguide according to claim 25 wherein the ~~lower cladding layer, where present, and~~ light transmissive element ~~comprise~~ comprises materials selected from polymeric materials, glass and semiconductors.

Claim 46 (Original): An integrated optical waveguide according to claim 45, wherein the polymeric materials comprise polymers curable by actinic radiation.

Claim 47 (Original): An integrated optical waveguide according to claim 46, wherein the actinic radiation is ultraviolet light.

Claim 48 (Original): An integrated optical waveguide according to claim 47, wherein the polymeric material is a siloxane polymer.

Claim 49 (Withdrawn): A method of fabricating an optical waveguide device with a patterned upper cladding, comprising the steps of:

a) forming a patterned blocking layer opaque to a predetermined wavelength on a portion of a substrate transparent to the predetermined wavelength;

b) depositing a core layer on said patterned blocking layer and/or on an uncovered portion of the substrate;

c) patterning the core layer from above to provide a light transmissive element;

d) depositing an upper cladding layer, which comprises a material curable by exposure to light of the predetermined wavelength, on the light transmissive element and/or on the patterned blocking layer and/or on an uncovered portion of the substrate;

e) irradiating said upper cladding layer from below with light of the predetermined wavelength, to cure those portions of said upper cladding layer not positioned above said patterned blocking layer; and

f) removing non-cured portions of said upper cladding layer.

Claim 50 (Withdrawn): A method of fabricating an optical waveguide device with a patterned upper cladding, comprising the steps of:

a) forming a patterned blocking layer opaque to a predetermined wavelength on a portion of a substrate transparent to the predetermined wavelength;

b) depositing a lower cladding layer on said blocking layer and/or on an uncovered portion of said substrate;

c) depositing a core layer on said lower cladding layer;

d) patterning the core layer from above to provide a light transmissive element;

e) depositing an upper cladding layer, which comprises a material curable by exposure to light of the predetermined wavelength, on said light transmissive element and/or on an uncovered portion of said lower cladding;

f) irradiating said upper cladding layer from below with light of the predetermined wavelength, to cure those portions of said upper cladding layer not positioned above said patterned blocking layer; and

g) removing non-cured portions of said upper cladding layer.

Claim 51 (Withdrawn): A method according to claim 49 wherein the substrate comprises silicon, quartz, fused silica, glass, or a polymeric material.

Claim 52 (Withdrawn): A method according to claim 51, wherein the polymeric material comprises an acrylate, Perspex, polymethylmethacrylate, polycarbonate, polyester, polyethyleneterephthalate or PET.

Claim 53 (Withdrawn): A method according to claim 49 , wherein the patterned blocking layer is formed by screen printing.

Claim 54 (Withdrawn): A method according claim 49 wherein the upper cladding layer comprises a polymer curable by exposure to light of the predetermined wavelength.

Claim 55 (Withdrawn): A method according to claim 54, wherein the predetermined wavelength is in the ultraviolet region.

Claim 56 (Withdrawn): A method according to claim 55, wherein the polymer is a siloxane polymer.

Claim 57 (Withdrawn): A method according to claim 49, wherein the patterned blocking layer comprises a compound that absorbs light of the predetermined wavelength.

Claim 58 (Withdrawn): A method according to claim 49, wherein the patterned blocking layer comprises a pattern of scattering surfaces, wherein the scattering surfaces scatter light of the predetermined wavelength, effectively blocking transmission of said light.

Claim 59 (Withdrawn): A method according to claim 58, wherein the scattering surfaces are produced by mechanical abrasion.

Claim 60 (Withdrawn): A method according to claim 58, wherein the scattering surfaces are produced by chemical etching.

Claim 61 (Withdrawn): A method of fabricating an optical waveguide device with a patterned upper cladding, comprising the steps of:

a) depositing a lower cladding layer on a substrate transparent to light of a predetermined wavelength;

b) forming a patterned blocking layer opaque to light having the predetermined wavelength on said lower cladding layer;

c) depositing a core layer on said blocking layer and/or on an uncovered portion of the lower cladding layer;

d) patterning the core layer from above to provide a light transmissive element;

e) depositing an upper cladding layer, which comprises a material curable by exposure to light of the predetermined wavelength, on said light transmissive element and/or on said blocking layer and/or on said lower cladding layer;

f) irradiating said upper cladding layer from below with light of the predetermined wavelength, to cure those portions of said upper cladding layer not positioned above said patterned blocking layer; and

g) removing non-cured portions of said upper cladding layer.

Claim 62 (Withdrawn): A method according to claim 61, further comprising the steps of:

i) forming a lift-off layer after forming the patterned blocking layer and before depositing the lower cladding layer; and

ii) removing the lift-off layer after removal of the non-cured portions of said upper cladding layer, to separate the lower cladding layer, light transmissive element and patterned upper cladding from the substrate.

Claim 63 (Withdrawn): A method according to claim 61, further comprising the steps of:

i) forming a lift-off layer on the substrate before depositing the lower cladding layer; and

ii) removing the lift-off layer after removal of the non-cured portions of said upper cladding layer, to separate the lower cladding layer, patterned blocking layer, light transmissive element and patterned upper cladding from the substrate.

Claim 64 (Withdrawn): A method according to claim 61, wherein the substrate comprises silicon, quartz, fused silica, glass, or a polymeric material.

Claim 65 (Withdrawn): A method according to claim 64, wherein the polymeric material comprises an acrylate, Perspex, polymethylmethacrylate, polycarbonate, polyester, polyethyleneterephthalate or PET.

Claim 66 (New): An integrated optical waveguide according to claim 25 including a lower cladding layer between the substrate and the light transmissive element.

Claim 67 (New): An integrated optical waveguide according to claim 66 wherein the lower cladding layer comprises materials selected from polymeric materials, glass and semiconductors.